AMATEUR RADIO

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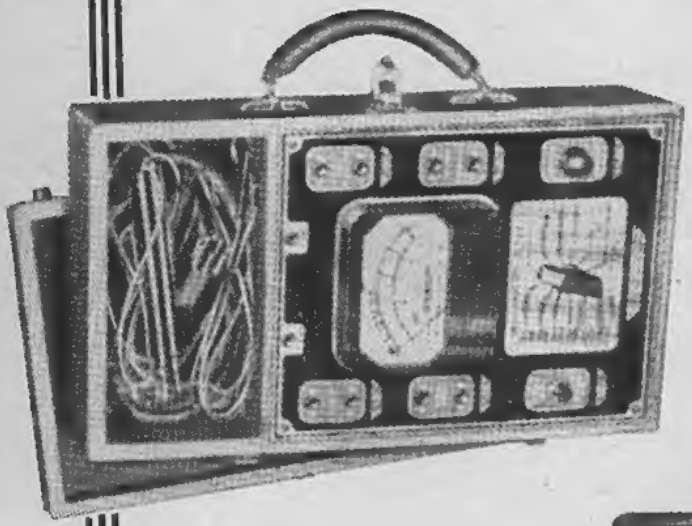
MAY, 1940

WESTON *Instruments*



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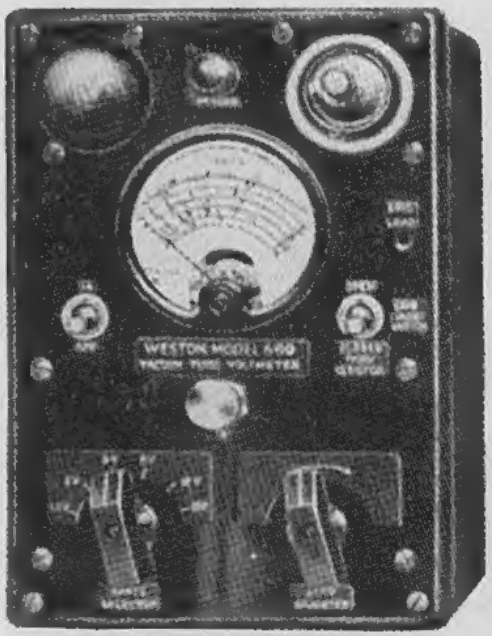

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EDITORIAL

Mr. J. M. MARTIN'S APPOINTMENT AS CHIEF INSPECTOR WIRELESS.

We record with sincere pleasure the fact that Mr. J. M. Martin's appointment as Chief Inspector Wireless, has been confirmed by the powers that be.

His genial personality, not always readily apprehended through his official communications, is already known and appreciated by every official of the W.I.A., not forgetting those few amateurs who have been fortunate or unfortunate enough, as the case may be, to have received an invitation "into the presence" for some fatherly advice.

Which advice by the way is designed to ensure a reasonable interpretation of the "Regulations," coupled with a sincere dsire to give the amateur a "fair go."

We feel that this appointment ensures a continuation of that co-operation which the W.I.A. has always possessed with the P.M.G.'s Department. We all sincerely wish him every success in his new office.

BANNED TECHNICAL PUBLICATIONS.

The Customs Import Licensing Regulations are here in force, and how—. It is not too strong to say that we are horrified to observe that such outstanding publications as Q.S.T. — Electronics — Radio, etc., were placed on the prohibited list, except for individual subscriptions. These overseas technical magazines are one of the few things that an intelligent community must have, if it is to advance in Radio and Electricity. No country, especially Australia, which is striving to build up its secondary industries, can afford to prevent any of its intellectually minded citizens from improving their technical knowledge, by making the purchase of these magazines more difficult. Also we feel that such readers are definitely penalised from purchasing these publications by annual subscriptions, which is difficult to produce in a lump sum, whereas a monthly purchase from a bookstall is hardly missed from the pocket of the humblest worker. We can do without some of the questionable overseas literature exhibited so freely to-day, but not, definitely not, without our leading American technical publications.

This subject will be taken up by the W.I.A. with the Controller General of Customs at Canberra without delay.

AUSTRALIAN AIR LEAGUE.

The Victorian Division has offered to conduct Instructional Classes for members of the above Society, with a view to training the personnel in Wireless Telegraphy. The course will cover elementary radio and electricity, paying particular attention to morse code and operating procedure. These classes will be held in the Division's Rooms one night each week and should prove of great value to those participating. A small charge will be made, and it is anticipated that about thirty students will be enrolled.

Although the standard will not be quite as high as that necessary for the A.O.C.P., it will, however, provide the students with a good basic training in radio, thus fitting them to undertake operational duties in their own organisation.

Radiotron Senior Amateur Receiver

Extracted from "Radiotronics" No. 102.

Nearly three years ago we described a receiver which had been constructed in our laboratory and which was then believed to be ideal for amateur reception of 'phone and C.W. During the past few months we have received many requests for information on this receiver, together with any comments which we could make to bring it more up-to-date. Since we have not yet been able to carry out the necessary extensive development work for a new receiver we are pleased to describe in this article the features which we would consider desirable in such a new design. At some future date we hope to complete this design and describe the receiver in Radiotronics.

The Radiotron Senior Amateur Receiver was described in Radiotronics 75 (30th April, 1937), pages 30 to 34. For the benefit of those who do not have this copy available the valve arrangement is listed below:—

R.F. Amplifier	Radiotron 956
Mixer	Radiotron 6L7
H.F. Oscillator	Radiotron 6D6
Noise Silencer	Radiotron 6L7
Noise Amplifier	Radiotron 6C6
Noise Rectifier	Radiotron 6H6
1st I.F. Amplifier	Radiotron 6D6
2nd I.F. Amplifier, Diode Detector and BFO Mixer	Radiotron 6B7S
Beat Frequency Oscillator	Radiotron 6J7
A.V.C. Diode and Audio Amplifier	Radiotron 75
Power Output	Radiotron 42
Magic Eye Tuning Indicator	Radiotron 6G5
Power Rectifier	Radiotron 80

When the Senior Amateur Receiver was in the process of design it was realised that a single R.F. stage using type 6D6 did not have sufficient gain to give low noise level on the highest frequency band (30 Mc/s). Consequently a single Acorn valve (type 956) was adopted as giving improved gain under these conditions without necessitating the use of a four-gang condenser. Subsequent experiments with regeneration, either in the mixer or in the R.F. stage, showed that, as a means of increasing R.F. sensitivity it was subject to certain disadvantages in that it had a serious effect on the tuning and on the image ratio as well as necessitating an additional control. It became obvious that, for a receiver of high sensitivity, two R.F. stages are highly desirable. If a suitable four-gang condenser is not available it should be possible to make use of a combination of two 2-gang condensers suitable for ganging. If two R.F. stages are used there is no necessity for using Acorn valves, since type 6U7-G will give reasonable gain at all frequencies, having the additional advantage of being Australian made.

The frequency converter stage is one which may be arranged in many ways. The original receiver used type 6L7 with a 6D6 oscillator; this was quite satisfactory and may be used with confidence. It has the disadvantages that the 6L7 is not Australian made and that a separate oscillator valve is essential.

Types 6J7-G and 1851 are both excellent as mixer valves, but are critical with regard to oscillator voltage; they also introduce complications in the circuit design.

Type 6K8-G is excellent in many respects and does not require a separate oscillator. With two R.F. stages the somewhat higher noise level of this type would probably not be noticeable. A further advantage is that full A.V.C. may be applied with negligible frequency shift during fading.

Type 6A8-G may be used with a separate oscillator.

Type 6J8-G has many good features and, all factors considered, would probably be our first choice in a new design. It is now Australian made, it does not need a separate oscillator (except perhaps below 13 metres), it has excellent oscillator frequency stability provided that A.V.C. is not applied to its signal grid, and has a very low noise level.

It has the disadvantages of being degenerative and of introducing loading on the tuned grid circuit, although with two R.F. stages these effects should not prove serious. Plate tuning of the oscillator would probably be justified.

Type 6J8-G is in principle the same as the 6L7 with a separate oscillator, but the grid of the oscillator is internally connected to the third grid of the mixer. The performance is comparable with that of the 6L7 and some slight advantage over the 6L7 exists at the highest frequencies owing to the short leads and direct connection of the oscillator to the mixer section. The conversion conductance is slightly lower than that of the 6L7.

Crystal Filter and Noise Silencer.

The crystal filter is highly desirable for C.W. reception under difficult conditions but, as much listening is done on 'phone only, some users may prefer to omit the crystal altogether and thereby to save one valve. If the crystal filter is omitted the noise silencer as originally used may also be omitted, since its principal intention is to prevent "ringing" of the crystal due to transient peaks. An audio frequency "level limiter" of satisfactory design is considerably cheaper and may be equally as efficient as the noise silencer operating at intermediate frequency. A satisfactory level limiter would require to be adjustable so as to cut at any required depth of modulation, and should ideally be automatically controlled by the A.V.C. so that its action is not affected by the strength of carrier. Limiting circuits using a valve such as the 6H6-G are well known, but at the present time we are investigating one which does not require the use of such a valve. If this is successful it will be described at a later date.

If the crystal filter is required for C.W. reception it is desirable for it to be protected by a noise silencer operating at I.F. In the original circuit the gain in the single stage noise amplifier was not sufficient to give operation on weak impulses such as the ignition interference from cars. A higher gain in this channel, or a circuit rearrangement to give the same effect if this is possible, would be desirable.

The I.F. Amplifier (apart from the noise silencer stage which has very little gain) consists of two stages and experience has shown that the gain was unnecessarily high. Some form of flat-topping the I.F. transformers is very helpful when high selectivity is not required. A tertiary coil which may be switched in or out of circuit is simple to add to existing I.F. transformers, but its adjustment requires the use of a frequency modulated oscillator (wobbulator). If a two position selectivity switch is used, it is helpful to arrange matters so as to adjust the gain of the I.F. Amplifier, as the switch is moved, giving uniform gain in both positions. A subsidiary continuously variable I.F. gain control is an additional worthwhile feature.

The A.V.C. system as used in the original receiver could be improved by using a three or four position switch control of the time constant giving a very long time constant for C.W., a medium value for general use and a very short one for very rapid fading. The same switch could also be used for switching off the A.V.C.

A more elaborate tone control than that used in the original receiver appears to be desirable. One having independent control of bass and treble attenuation and three positions on each (including one with zero attenuation) should satisfy all requirements.

The layout of such a receiver is one of the most important factors in its satisfactory operation. The original receiver which was built in our laboratory was on a single chassis, and was rather cramped for space. As a separate loudspeaker is almost essential in any case (in order to avoid microphony) one practicable arrangement with many good features is to use one chassis for the tuner and a separate chassis for the A.F. Amplifier, Power Pack, etc., and Loudspeaker. Alternatively a single chassis and external loudspeaker may be used. Rigidity of the tuning chassis is essential for satisfactory operation, and nickel plated steel with solid brass bar reinforcement (as used in the original receiver) is recommended.

The coil switching arrrangement presents some difficulties. If listening is restricted largely to one or two bands it may be practicable to use plug-in coils. Those who have experienced the pleasure of multi-

band switching will not relish the work involved in changing four coils each time the frequency band is changed. A multi-band switching system is often regarded as being too ambitious for the average amateur constructor, although in our opinion it is quite practicable. A compromise may be adopted in the combination of the two systems. For example, a three position switching system may be used, switching to either of two sockets for plug-in coils or to a fixed set of broacast coils. By this means either of two short wave bands or the broadcast band may be switched in without any changing of coils. Various other arrangements could be adopted to suit the requirements of the individual constructors such as for example a three position switch covering short wave bands, of which one could be a plug-in coil and the other two popular bands such as the 20 and 40 metre bands, the coils of which could be permanently in circuit.

A satisfactory band spreading arrangement is essential for such a receiver. In the original receiver the band setting condensers were not ganged, but this arrangement has been found to be rather unsatisfactory and a ganged control will be used in any future design. This introduces additional complications, particularly if four tuned sections are required, as would be the case with two R.F. stages. In spite of these difficulties we are of the opinion that such an arrangement is desirable and practicable provided that the constructor is prepared to take the necessary trouble. We hope to say something further about a method of band-spreading for this receiver at some future date.

FEDERAL CONVENTION.

Owing to the war, with its consequent effect on all Divisions of the Institute, Federal Headquarters realised that there was no good purpose to be served by calling the usual Federal Convention which should have been held this year. At the present moment, adequate machinery is available between Divisions and F.H.Q. to adjust anything of a Federal nature, and it was felt that the expense of a convention would not be justified at the present time.

HIGH FIDELITY AUDITORIUM PERMANENT MAGNET MOVING COIL REPRODUCERS

By courtesy of "Trimax" Transformers Pty. Ltd. Agents for "Goodman's" English Speakers.

The High Fidelity Auditorium Loudspeakers described in this bulletin have been developed with a view to producing, commercially, Loudspeakers which represent as high a standard of reproduction as present day knowledge permits.

The 12 inch Model is designed for use with inputs up to 12 watts peak, necessitating the use of a voice coil of not less than 1½ in. diameter. Such a rating, however, is unnecessarily high for domestic and light Public Address work, and so the 10 in. Model, fitted with a 1 in. voice coil is offered for inputs up to 6 watts peak. In designing the Goodman's Auditorium Loudspeakers, the following specifications was kept constantly in view:—

1. Level response.
2. Frequency range.
3. Reduction of sub-harmonics.
4. Transient response.
5. Elimination of Bass modulation of the upper frequencies.
6. Freedom from hum.

To obtain a flat response it is necessary to employ a magnetic field of high flux density, to damp down resonance due to the tension of the surround and centreing device. A flux density of 16,000 lines per sq. cm. was considered to be as high as commercially practicable for either a Permanent Magnet or Energised Field, so this figure was chosen as a basis for the 12 in. Auditorium Loudspeaker. In the case of the 10 in. Model, the highest flux density obtainable on a 1 in. pole, i.e., 13,000 lines per cm. is used. It was found essential to employ a special grade of material for the centre pole to carry the enormous flux density necessary to obtain this figure.

It was the designers' aim to construct instruments capable of reproducing frequencies from 50 cps to 12,000 cps without any audible peaks or dips in the output. Tackling the lower register first, it was obvious that a fairly large cone would have to be used, to radiate a reasonable amount of power without undue axial movement of the diaphragm. Realising that it would be impossible to obtain real top response with a diaphragm of this construction, attention was turned to various types of "Tweeter Units." These worked fairly satisfactorily, but unfortunately their output was badly attenuated at frequencies below 3,500 cps, thus preventing the usual upper middle resonance to be filtered out from the large diaphragm speaker.

Experiments were then carried out with an additional small cone inside the main diaphragm, and as was anticipated, proved very successful. Not only was it possible to obtain a response up to 14,000 cps. but the usual 2,000 cps. to 3,000 cps. resonance was entirely eliminated, due to the damping action of the small cone on the voice coil. Considerable experimental work was entailed, to obtain the exact combination of sizes and angles of the two cones.

In the 10 in. Model, the Speech Coil is approximately 1 in. diameter and wound with sufficiently heavy gauge wire to efficiently carry the A.C. current supplied to it, having the optimum number of turns for the impedance of the coil. A 1 in. coil has also the advantage of lightness in weight, consequently extending the frequency range in the upper register. Due to the extreme lightness of the Voice Coil and Centreing Device, the Diaphragm assembly must also be light in weight. This is essential to obtain the maximum efficiency from the voice coil. By limiting the actual moving section of the diaphragm to a diameter of 9 in., a fairly rigid cone may be employed giving freedom from break-up and consequent reduction in sub-harmonics.

Reference to the response curves of Goodman's High Fidelity Twin

Diaphragm Auditorium Reproducers shows their practically level response from 50 cps. to 12,000 cps.

Particular attention is drawn to the decibel scale against which the curves are plotted. This must be taken into consideration if comparison with other published curves is made. The apparent falling off in output from 50 cps. downwards is attributiable to the use of only a 42in. baffle for recording purposes. A baffle of this size is insufficient for full reproduction of the lowest frequencies. Actually, the speakers have a useful output from 25 cycles to 14,000 cycles in the 12 in. model and from 40 cycles to 14,000 cycles in the 10 in. model, although no actual measurements have been made for frequencies above 12,000 cps.

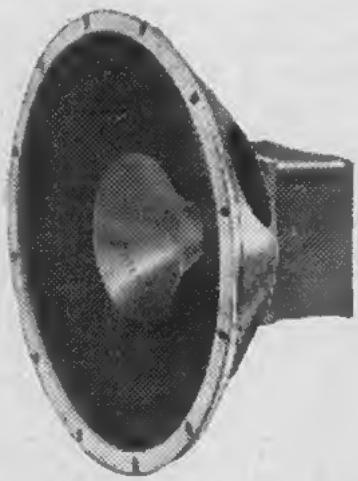
A very objectionable form of distortion prevalent with loudspeakers capable of reproducing high notes, is that due to the formation of sub-harmonics of the applied frequency. Such distortion manifests itself as harshness in the extreme top of the frequency scale.

Sub-harmonics, as their name implies are dividends of the original frequency, in contradistinction to harmonics, which are multiples of the original frequency. The cause of sub-harmonics has not been definitely established, but, the almost universally accepted theory can be defined as follows:—

If a strip of resilient material is fixed at one end, and pressure applied to the other, in a direction parallel to its longitudinal axis, the strip will bow in one direction. If now the pressure is released, the strip will not only return to its normal position, but owing to its momentum will tend to bow slightly in the opposite direction. If pressure is again applied to the end of the strip, before it has had time to return to its original position, the flexing will proceed in an opposite direction to that caused by the first pressure.

It will thus be seen that although we have applied two complete cycles we have only obtained one vibration of the strip. By the use of a curved sided or exponential cone, the effect described above, can be almost entirely eliminated. It is fairly obvious that if we start with a strip which, in its quiescent condition, is already curved, pressure applied intermittently to one end will only tend to increase and decrease the amount of curvature. For the centre cone a curvature of comparatively small radius is necessary, whereas only a slight curvature is used in the main diaphragm, where sub-harmonics are not likely to be troublesome, due to the fact that the main diaphragm is only used to reproduce the lower frequencies. Another very desirable feature of the curved diaphragm is that owing to its increased radial rigidity, a very much lighter and thinner material may be used. The centre cone employed in these Auditorium Loudspeakers are specially impregnated under extreme pressure, thus forming a very hard and rigid, but extremely light diaphragm. (These exponential cones are fully covered by Letters Patent, Pat. No. 451,754).

The reproduction of transients (viz. the ability of the loudspeaker to follow the sudden rise and fall of the almost vertical wave front of a train of sound waves such as is radiated by percussion instruments) is governed almost entirely by the motional inertia of the coil and diaphragm assembly, and the damping action due, mechanically, to the centreing device, and electrically, to the

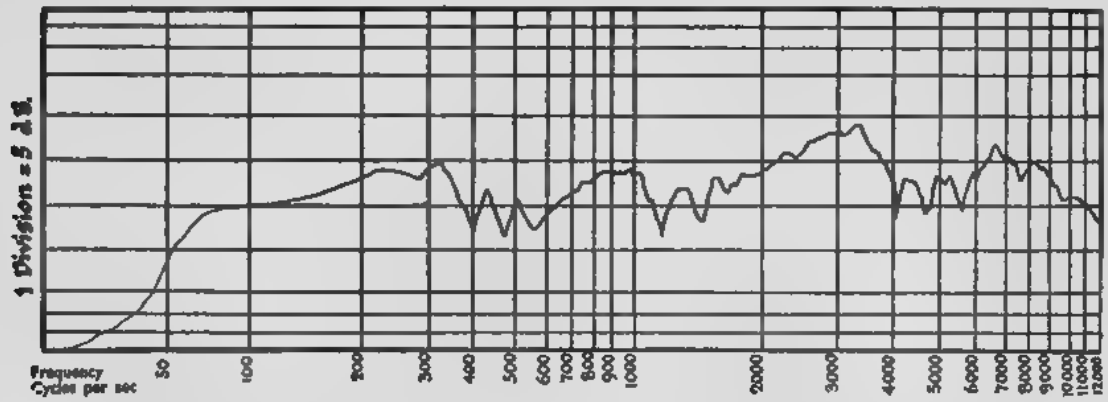


10 inch Model Goodman Speaker.

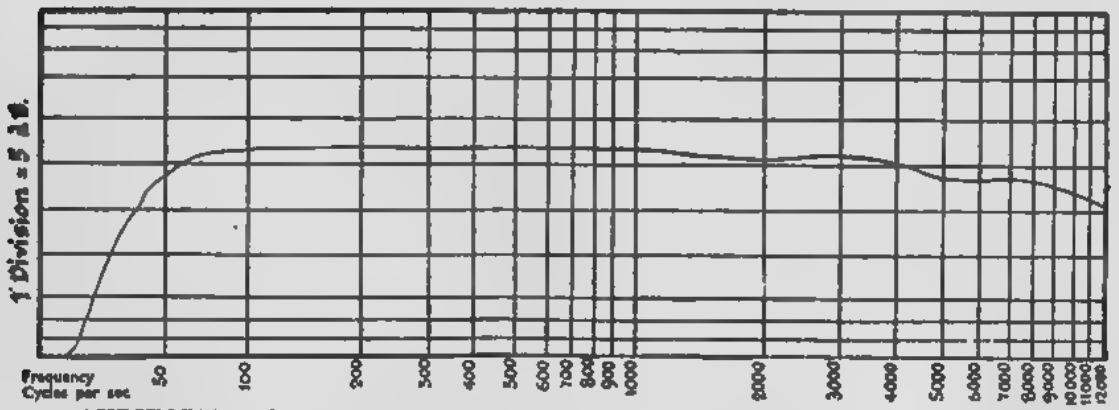
magnetic field in the gap. The field creates a back e.m.f. in the coil which is 180 degrees out of phase with the input voltage of the signal, tending to restore the voice coil to its original position. The greater the field density the greater the damping action. Since the back e.m.f. is de-

pendent on the velocity of the coil and the field strength, it will be apparent that magnetic damping is superior to mechanical as in the latter case, the restriction of the centreing device will have an adverse effect on the low notes and will cause rectification or frequency doubling. On the other hand, magnetic damping has less effect on pure notes than on transients. Unfortunately, some form of centreing device is necessary to prevent the coil rubbing on the sides of the gap, but these Auditorium Speakers employ devices having long flexible arms, which only have a very slight restrictive effect on the movement of the voice coil. Considerable care had to be taken to ensure that the movement should be strictly linear over the maximum possible travel of the voice coil. The cause of motional inertia of the diaphragm can be divided into two classes, one due to the actual mass or weight of the coil, etc., and the other due to the mass of the air column acted upon by the diaphragm. It is obvious that the first difficulty can only be dealt with by making the voice coil, diaphragm, etc., as light as it is possible with reasonable rigidity. The second difficulty is rather more troublesome to overcome but in the case of the Auditorium twin diaphragm Speakers, the motional resistance during the reproduction of transients is very materially reduced by introducing a compliance by means of a slight softening of the main diaphragm at its apex, so that the diaphragm does not respond to any sudden movement of the voice coil. This movement of the voice coil is transmitted direct to the centre diaphragm which is extremely light and rigid and has considerably smaller area than the main diaphragm and is therefore admirably suited to the handling of transients. A noticeable feature of these Auditorium Loudspeakers is their ability to give smooth bass response with a simultaneously clear, crisp transient response, or attack.

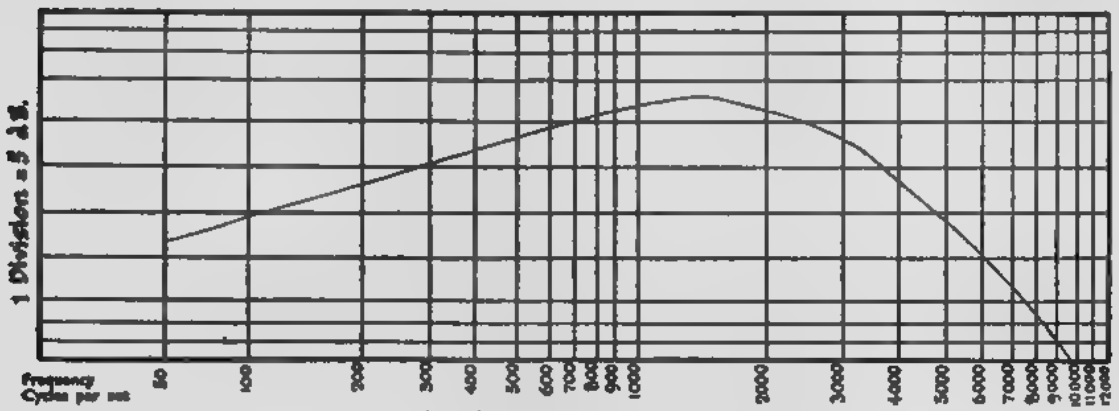
Bass modulation of the upper frequencies is the cause of a very unpleasant form of distortion which



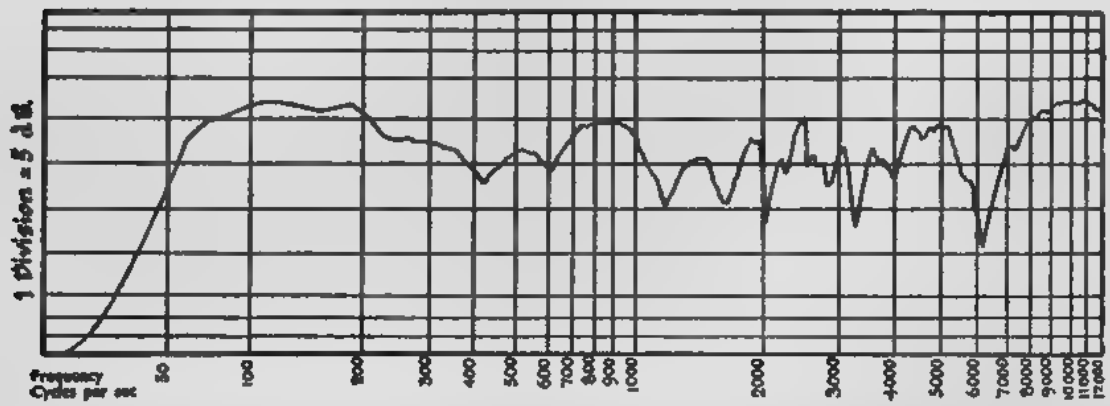
12 inch High Fidelity Twin Diaphragm AUDITORIUM Loudspeaker.



AUDITORIUM Output Transformer. Heavy Duty type for 2 P.X. 25 Voles P/P.



Typcal 5 Valve Super-heterodyne RECEIVER.



10 inch High Fidelity Twin Diaphragm AUDITORIUM Loudspeaker.

manifests itself as a ripple superimposed on the high notes. It very often gives a "throttled" tone to the reproduction. This is caused by the voice coil, during its axial travel at low frequencies (where the movement is at a maximum) cutting a magnetic field of varying intensity. Assuming a coil the same length as the gap, and with the coil at rest, the whole of the coil will be acted upon by the magnetic field, but immediately the coil starts to move, some of the turns will pass outside the field, or at any rate into a field of very much lower flux density. Since the driving force exerted by the coil on the diaphragm is the product of the flux, turns and current, a reduction in the flux means a reduction in the driving force. Take for example, a 50 cps. note with 1000 cps. note superimposed on it. During one half cycle of the 50 cps. vibration of the voice coil starting from the centre of the gap, or in other words through a phase angle of 180 degrees, the result will be $\frac{1000}{50 \times 2}$ equals 10 complete cycles of the 1000 cps. note. But each cycle will be gradually decreasing to a minimum and then increasing in intensity from the previous cycle, so that instead of reproducing a steady note at 1000 cps. we shall have a note with its intensity varying at the rate of 100 cps. This may be remedied either by arranging that the coil is very much longer than the gap, or that the gap is very much longer than the coil. In the first case a similar number of turns of wire is always in the gap, whilst in the second the coil is operating in a field of constant strength since the coil does not travel beyond the end of the gap. Both these methods cause a diminution in sensitivity, but owing to the greater axial length of the gap required for the second method, a much larger magnetic system is required to supply the increased total flux. In the Auditorium Speakers the first method is employed, to overcome the difficulty with the greatest economy of field strength. It has generally been presumed that Energised Moving Coil Loudspeakers are superior to Permanent Magnet types. The question of flux density is governed by the amount of magnetic material employed. Prior to the introduction of special alloys it would have been necessary to employ enormous magnets at prohibitive prices in order to obtain flux densities approaching those obtained by energised loudspeakers.

In designing the Auditorium Loudspeakers it was decided to fit Permanent Magnets, provided flux densities, at least equal to those of large energised speakers consuming 30 watts in the field, could be obtained. These densities were standardised as 16,000 lines per sq. cm. for the 12 in. model using 1½ in. diam. pole, and 13,000 lines per sq. cm. for the 10 in. model using a 1 in. pole. By the use of nickel aluminium cobalt alloy, it was found possible to obtain these flux densities, in either specified gap. It is safe to assume that very few large energised speakers receive the full energising current recommended by their manufacturers, owing to the expense and difficulty of installing the necessary equipment. A Permanent Magnet however, is constantly giving its full flux density, and except in the case where an accumulator is used for supplying the field current, the Permanent Magnet has the very definite advantage of minimising any tendency for a 50 cps. or 100 cps. hum.

To operate either of these twin diaphragm Auditorium Loudspeakers successfully, it is necessary that a high grade receiver or amplifier be used. The output stage should have a large reserve of power, to keep the percentage of second harmonic down to an absolute minimum. Owing to the extreme efficiency in the upper register of these Auditorium Loudspeakers, any harmonic distortion present in the amplifier will be immediately apparent and will appear as a rattle in the loudspeaker. Two medium slope triodes working in push-pull and having a combined output of 10 to 12 watts are strongly recommended for the 12 in model. In the case of the 10 in speaker, the use of a single 6 watt medium slope triode has proved very successful. It is advisable to incorporate some form of variable selectivity device in the high frequency side of the receiver, so that when possible, full advantage may be taken of the maximum side bands transmitted.

Where the speaker is intended for the reproduction of gramophone records, it is absolutely essential to employ a "scratch" filter. This should, for preference, be variable.

SHORT-WAVE BROADCASTING STATIONS OF THE WORLD IN ORDER OF FREQUENCY

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With acknowledgments.

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Cincinnati (U.S.A.)	WLWO	6.06	49.50
British Overseas Service	GSL	6.11	49.10
Wayne (U.S.A.)	WCBX	6.12	49.02
Lahti (Finland)	OFD	6.12	49.02
Pittsburgh (U.S.A.)	WPIT	6.14	48.86
Winnipeg (Canada)	CJRO	6.15	48.78
Wayne (U.S.A.)	WCBX	6.17	48.62
Schenectady (U.S.A.)	WGEO	6 19	48.47
Vatican City	HVJ	6.19	48.47
Rome (Italy)	IAC	6.35	47.20
Radio-Nations (Switzerland)	HBQ	6 67	44 94
Valladolid (Spain)	FETI	7.07	42.43
41-Metre Band (7.20-7.30 Mc/s)			
British Overseas Service	GSW	7.23	41.49
Tokio (Japan)	JVW	7 25	41.34
British Overseas Service	GSU	7.26	41.32
Lisbon (Portugal)	CSW8	7.26	41.32
Zeesen (Germany)	DXM	7.27	41.27
Paris-Mondial (France)	TPB7	7.28	41.21
Zeesen (Germany)	DJI	7.29	41.15
Moscow (U.S.S R.)	RWG	7.36	40 76
Moscow (U.S.S.R.)	RKI	7.52	39.89
Moscow (U.S.S.R.)	—	8.07	37.17
Budapest (Hungary)	HAT4	9.12	32 88
Bucharest (Rumania)	—	9.28	32 33
Radio Nations (Switzerland)	HBL	9.34	32.12
Ankara (Turkey)	TAP	9.46	31.70
St. John's (Newfoundland)	VONG	9.48	31.64
31-Metre Band (9.50-9.70 Mc/s)			
Belgrade (Yugoslavia)	YUC	9.50	31.58
Lahti (Finland)	OFD	9.50	31.58
British Oversea Service	GSB	9.51	31.55
Melbourne (Australia)	VK3ME	9.51	31.55
Paris-Mondial (France)	—	9.52	31.51
Schenectady (U.S.A.)	WGEO	9.53	31.48
Tokio (Japan)	JZI	9.53	31.48
Motala (Sweden)	SBU	9.53	31.48
Moscow (U.S.S.R.)	—	9.53	31.48
Zeesen (Germany)	DJN	9.54	31.45
Vatican City	HVJ	9.55	31.41
Schenectady (U.S.A.)	WGEA	9.55	31.41
Zeesen (Germany)	DJA	9.56	31.38
Pittsburg (U.S.A.)	WPIT	9.57	31.35
Millis (U.S.A.)	WBOS	9.57	31.35
British Oversea Service	GSC	9.58	31.32
Melbourne (Australia)	VLR	9.58	31.32
Huizen (Holland)	PCJ	9.59	31.28
Sydney (Australia)	VK2ME	9.59	31.28
Athlone (Ireland)	—	9.59	31.28
British Oversea Service	GRY	9.60	31.25
Moscow (U.S.S.R.)	RAL	9.60	31.25
Zeesen (Germany)	DXB	9.61	31.22
Cape Town (Sth. Africa)	ZRL	9.61	31.22
Sydney (Australia)	VLQ	9.61	31.22
Budapest (Hungary)	HAD	9.62	31.17
Rome (Italy)	I2RO3	9.63	31.15
Wayne (U.S.A.)	WCBX	9.65	31.09
Vatican City	HVJ	9.66	31.06
Buenos Aires (Argentine)	LRX	9.66	31.06
Rome (Italy)	I2RO9	9.67	31.02
Zeesen (Germany)	DJX	9.67	31.02
Paris-Mondial (France)	TPA4	9.68	30.99
Moscow (U.S.S.R.)	RW96	9.69	30.98
British Oversea Service	GRX	9.69	30.96
Buenos Aires (Argentine)	LRA1	9.69	30.96
Lisbon (Portugal)	CSW7	9.74	30.80
Rome (Italy)	IRF	9.83	30.52
Madrid (Spain)	EAJ7	9.86	30.43
Zeesen (Germany)	DZC	10.29	29.16
Buenos Aires (Argentine)	LSX	10.35	28.99
Lisbon (Portugal)	CSW6	11.04	27.17
Radio-Nations (Switzerland)	HBO	11.40	26.31
Moscow (U.S.S.R.)	—	11.64	25.77
Rome (Italy)	IQY	11.67	25 70
25-Metre Band (11.70-11.90 Mc/s)			
Motala (Sweden)	SBP	11.70	25.63
Paris-Mondial (France)	TPA4	11.72	25.60
Winnipeg (Canada)	CJRX	11.72	25.60
Huizen (Holland)	PHI	11.73	25.58
Boston (U.S.A.)	WRUL	11.73	25.58
Vatican City	HVJ	11.74	25.55
British Oversea Service	GSD	11.75	25.53
Rome (Italy)	I2RO15	11.76	25.51
Zeesen (Germany)	DJD	11.77	25.49
Hsinking (Manchukuo)	MTCY	11.77	25.49
Saigon (French Indo-China)	FZR	11.78	25.47
Boston (U.S.A.)	WRUL	11.79	25.45
Rome (Italy)	I2RO4	11.81	25.40
British Oversea Service	GSN	11.82	25.38
Wayne (U.S.A.)	WCBX	11.83	25.36
Lisbon (Portugal)	CSW5	11.84	25.34
Zeesen (Germany)	DJP	11.85	25.31
Budapest (Hungary)	HAD	11.85	25.31
British Oversea Service	GSE	11.86	25.29
Pittsburg (U.S.A.)	WPIT	11 87	25 27
Sydney (Australia)	VLQ2	11.87	25.27
Paris-Mondial (France)	TPA3	11 88	25 25
Melbourne (Australia)	VLR3	11.88	25.25
Chungking (China)	XGOY	11.90	25 21
Moscow (U.S.S.R.)	—	11.90	25.21
Moscow (U.S.S.R.)	RNE	12 00	25.00
Zeesen (Germany)	DZH	14 46	20.75
Radio-Nations (Switzerland)	HBJ	14.54	20.64
Rome (Italy)	IQA	14.79	20 28

19-Metre Band (15.10-15.35 Mc/s)

Moscow (U.S.S.R.)	RKI	15.04	19.95
Rome (Italy)	I2RO12	15.10	19.87
Zeesen (Germany)	DJL	15.11	19.85
Vatican City	HVJ	15.12	19.84
Paris-Mondial (France)	TPB6	15.13	19.83
Boston (U.S.A.)	WRUL	15.13	19.83
British Oversea Service	GSF	15.14	19.82
Motala (Sweden)	SBT	15.15	19.80
Moscow (U.S.S.R.)	RW96	15.18	19.76
British Oversea Service	GSO	15.18	19.76
Lahti (Finland)	OIE	15.19	19.75
Zeesen (Germany)	DJB	15.20	19.74
Chungking (China)	XGOX	15.20	19.74
Ankara (Turkey)	TAQ	15.20	19.74
Pittsburg U.S.A.)	WPIT	15.21	19.72
Lisbon (Portugal)	CSW4	15.21	19.72
Huizen (Holland)	PCJ2	15.22	19.71
Podebrady (Bohemia)	OLR5A	15.23	19.70
Paris-Mondial (France)	TPA2	15.24	19.68
Boston (U.S.A.)	WRUL	15.25	19.67
British Oversea Service	GSI	15.26	19.66
Wayne (U.S.A.)	WCBX	15.27	19.65
Philadelphia (U.S.A.)	WCAB	15.27	19.65
Zeesen (Germany)	DJQ	15.28	19.63
Delhi (India)	VUD3	15.29	19.62
Buenos Aires (Argentine)	LRU	15.29	19.62
Rome (Italy)	I2RO6	15.30	19.61
British Oversea Service	GSP	15.31	19.60
Schenectady (U.S.A.)	WGEA	15.33	19.57
Zeesen (Germany)	DJR	15.34	19.56
Zeesen (Germany)	DZG	15.36	19.53
Budapest (Hungary)	HAS3	15.37	19.52
Moscow (U.S.S.R.)	RW96	15.41	19.47

16-Metre Band 17.75-17.85 Mc/s)

Zeesen (Germany)	DJE	17.76	16.89
Huizen (Holland)	PHI	17.77	16.88
Paris-Mondial (France)	TPC3	17.77	16.88
Pittsburg (U.S.A.)	WPIT	17.78	16.87
Bound Brook (U.S.A.)	WNBI	17.78	16.87
British Oversea Service	GSG	17.79	16.86
British Oversea Service	GSV	17.81	16.85
Rome (Italy)	I2RO8	17.82	16.84
Wayne (U.S.A.)	WCBX	17.83	16.83
Zeesen (Germany)	DJH	17.84	16.82
Athlone (Ireland)	—	17.84	16.82
Paris-Mondial (France)	TPB3	17.85	16.81

13-Metre Band (21.45-21.75 Mc/s)

British Oversea Service	GSH	21.47	13.97
Schenectady (U.S.A.)	WGEA	21.50	13.95
Rome (Italy)	I2RO16	21.51	13.95
Philadelphia (U.S.A.)	WCAB	21.52	13.94
British Oversea Service	GSJ	21.53	13.93
Pittsburg (U.S.A.)	WPIT	21.54	13.93
British Oversea Service	GST	21.55	13.92
Wayne (U.S.A.)	WCBX	21.57	13.91
Schenectady (U.S.A.)	WGEO	21.59	13.89
British Oversea Service	GRZ	21.64	13.86

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Microphone Types

By A. E. Walz (ex VK4AW).

The function of a microphone is to convert sound into electrical energy, and the quality of reproduction depends on the type used and its efficiency in its particular class. An amplifier can reproduce only that which is put into it, so it should be bourne in mind that a little thought exercised in the choice of microphone equipment amply repays the user.

Of the five common types in wide use to-day, the single button carbon is the most common, being used in telephone, office, Deaf Aid and general communication where speech is the only important consideration. This type consists of a diaphragm which is actuated by the compressions and rarefactions of the air (sound waves) exerting a variation of mechanical pressure on a bank of carbon granules, usually placed between two carbon electrodes, one of which is attached to the diaphragm. The variation of pressure on the granules causes a corresponding variation of resistance to an external D.C. voltage applied with a subsequent variation of current through the microphone transformer primary.

The Double Button type is a variation of the previous mentioned, consisting of a very thin stretched diaphragm with carbon granule chambers on each side. This type gives better quality output than the single button variety with loose diaphragm, in that the stretched diaphragm's natural frequency is in the region of 8000 C.P.S., well up on the scale, and of its low, even harmonic distortion due to the old push pull principle.

Another variation of the carbon mike is the Reiss, which was so popular a few years ago. It consists briefly of a wide channel of high grade granules between two carbon or gold-plated brass electrodes embedded in a block of very "dead" material such as wood, marble being used in the better types, the granules being fronted by a mica diaphragm. The purpose of the diaphragm was not so much to impart sound pressure to the granules as to merely keep the granules in place, the sound pressure acting directly on the granules. The output of this type is fairly low in comparison with the single button, and the energising voltage owing to the high resistance of the large area of granules. The Reiss was used extensively by nearly all Broadcasting Stations until quite recently, when better class mikes became readily available. They were used for both studio and outside broadcasts, and even now some broadcasting stations still rely on the Reiss for outside work. The main advantages are low cost, fairly good output, correct impedance for use on long leads, and ideal for speech frequencies. The main disadvantage of carbon mikes are high noise or hiss level, and inconsistent output due to "packing" and a tendency to "blast."

Another type, the Condenser, requiring more mechanical skill in its construction, has been used mainly in studio work, but has not been a very firm favorite in ham use. It briefly consists of a stretched thin Dural diaphragm, closely spaced and insulated from a perforated back plate (perforations to relieve back pressure), with an applied voltage in the region of 200 v. The mike acts as two plates of a condenser with its dialectric under constant strain by the applied voltage, any variation of capacity caused by sound pressure on the front plate, causing an A.C. voltage to develop, which is applied to the grid of a valve via the usual condenser coupling method. It is essential that this type have the following amplifier stage directly at the head of the condenser itself to prevent hum, R.F. pick-up and variation in capacity due to frail leads. The condenser type is sensitive to changes in barometric pressure and humidity, and in some cases the mike is used with a gas dialectric. Its disadvantages may be gleaned from the foregoing, and advantages chiefly entire absence of noise level and very high quality output. On good authority, railway whistles could be heard over a network using one of these mikes at a local studio, when same whistles could not be noticed by the announcing staff at the station.

The crystal microphone of the diaphragm type, which has gained such popularity among hams of recent years, depends for its action on a Rochelle salt crystal, which, when pressure is exerted in the form of bending the crystal, develops a voltage across alternate plates, actually grown into the crystal itself. The diaphragm, which is conical, is attached at its centre to the centre of its crystal, which is anchored at both ends to a solid base. The large surface area of the diaphragm on being agitated by sound waves, exerts a bending on the crystal, thus causing a voltage to be developed. The chief advantages are simplicity, reasonable output level and good quality. The disadvantages, chiefly in the earlier types, lies in the fact that the crystal could not withstand humidity and moisture, and had the bad habit of suddenly disintegrating.

The more costly type of crystal dispenses with the diaphragm and uses a number of crystals as cells connected in series parallel to increase the output level, the sound pressure being exerted direct on the crystals themselves. The cost of apparatus of this class, of course, is beyond the average ham, but it finds favour in broadcasting and recording studios.

The velocity or ribbon type, another which has been constructed and used by numerous hams, is of the inductor type, and depends for its action on a $\frac{1}{2}$ mil. corrugated strip of dural, actuated in a magnetic field. The same principle exists in an induction disc motor and in the movement of a milliameter, the coil of which is wound on an aluminium form, so that when the needle moves quickly an E.M.F. is set up in the former thus retarding or damping the swinging action of the needle as it comes to rest. The advantages of this type are ruggedness and high quality output and ability to cut down pick-up from side on and in the double ribbon types big reduction of audio feedback. Disadvantages are prone to pick-up stray 60 cycle hum from magnetic fields, R.F. pick-up, and boominess when spoken into closely, although this can be overcome. This type relies on the sound velocity affecting the ribbon rather than the sound pressure, hence the term "velocity microphone."

(To be continued).

METRO-GOLDWYN-MAYER'S NEW RELEASE "RADIO HAMS."

America's foremost hobby discoverer, Pete Smith, has found out what makes Amateur Radio appeal, and tells the story well in his new specialty for Metro-Goldwyn-Mayer in "Radio Hams."

"Radio Hams" opens with a view of amateur operator Jimmy Mulligan at work with his gear. He is thinking perhaps, Smith suggests, of duplicating the feat of a Z.L. ham, who saved the life of a noted M-G-M cameraman, Clyde De Vinna, while he was filming "Eskimo," in Alaska, in 1932.

A ham himself, De Vinna was conversing with a ZL friend thousands of miles away, when he was overcome by fumes from his coal stove. The ZL, realising that something was wrong, quickly contacted another "ham," who lived nearby, and secured his assistance. A doctor was called and De Vinna's life was saved.

Another thrilling episode to be seen in the film concerns an amateur who was in a plane during a hurricane in an attempt to locate a missing vessel. He managed to keep the entire Atlantic seaboard posted on his position. Just before sighting the ship, his plane ran out of gas, but he managed to radio the ship's position before he and his pilot crashed and were killed.

This picture shows some of the interesting sidelights of "ham" radio, and will prove of interest to all amateur operators.

The film will be screened at the following Victorian Theatres, and interstate readers are advised to watch for announcements of its screening at their local theatres.

"Camden," Caulfield, May 25-31; "Embassy," Malvern, May 25-31; "Westgarth," Westgarth, May 25-31; "Planet," Thornbury, May 25-31; "Moonee Ponds," Moonee Ponds, May 25-31; "Plaza," Ormond, June 1-7; "Waverley," East Malvern, June 1-7; "Balwyn," Balwyn, June 1-7; "Vogue," Hawthorn, June 1-7; "Gardenvale," Gardenvale, June 8-14; "Grand," Footscray, June 8-14; "Sun," Yarraville, June 15-21; "Village," Toorak, June 15-21; "Astor," North St. Kilda, June 15-21; "Glen," Glenferrie, June 15-21; "Orient," Heidelberg, June 22-28; "Empire," Brunswick, June 22-28; "Western," West Brunswick, June 22-28; "Town Hall," North Melbourne, June 22-28; "Port," Port Melbourne, June 29-July 5; "Kinema," Albert Park, June 29-July 5; "National," Richmond, June 29-July 5; "Burnley," Burnley, June 29-July 5; "Liberty," East Brunswick, June 29-July 5; "Plaza," Coburg, June 29-July 5; "Star," Preston, July 29-July 5; "Regal," North Essendon, July 13-19.

FEDERAL and VICTORIAN QSL BUREAU

R. E. Jones, VK3RJ, Q.S.L. Manager.

Amateur Licences retored in Lithuania.

The L.R.M., the association of Lithuanian amateurs, who number 130, the transmitting licences being 64, report that their licences were suspended on 17th September, 1939, owing to the proximity of war. Many of the amateurs went into the army, and after the defeat of Poland and the restoration of Vilnius to the Lithuanians—Vilnius was taken from Lithuania by Poland in 1920—LY1J and LY1S provided valuable communication units for the government. Whilst in Vilnius, LY1J and LY1S visited what SP amateurs were still left, and found only a few, as most of the others had joined the Polish army. Licences were restored to Lithuanian amateurs on January 7th, 1940, the only condition imposed being that they did not work with belligerent countries. In normal times, LY hams must not use phone until over one year on cw has been fulfilled. The license also permits a power of 50 watts, but after two years it is possible to ask for and secure power up to 1000 watts.

The final list of cards on hand for VK3 hams is as follows:—

VK3CB, BG, DJ, EF, FW, FG, FZ, GN, GX, IJ, KX, LL, LM, NS, NP, PF, PH, UD, UP, VJ, VB, VD, VZ, VY, WT, XD, XP, XQ, XU, ZD, ZJ, ZR, KEC, GSJ.

These may be obtained from the Bureau in the usual manner.

A letter from G2MI, Q.S.L. Manager of the R.S.G.B., to this Bureau, presumes to give instructions and advice as to how a Q.S.L. Bureau should be run!!! Further advice is also tendered to the W.I.A. as to how it should run its affairs. Needless to say this bird is barking up the wrong tree and is a little behind the times with his reading, and as you may have suspected, has been told in no uncertain manner "just where he gets off."

One of our most unfortunate hams, VK3KV, who received his ticket, made six contacts, and then like the rest of us, lost his licence, has now announced the arrival of a junior op. We don't know whether the young fellow will ever learn the code—unless we get on the air after the war—but we hope so. Congratulations, om.

GERMAN AMATEURS USED AS PROPAGANDA STATIONS.

Amateurs all over the world have been wondering why certain German amateurs were allowed to remain on the air when war started. As more of them will shortly be on the air the following may be of interest.

From a reliable correspondent in U.S.A., VK3CX learns that D4BIU, who was until recently a student at Brown University in U.S.A., and who was on the Atlantic returning to Germany at the outbreak of war, has now obtained permission to come on the air again and according to this American amateur, he recently stated that a further 30 D stations would shortly be active. The German's main mission sems to be to work with as many American amateurs as possible.

The American amateurs have been asked by the A.R.R.L. not to

(Continued on page 19)

Short Wave and DX Section

SHORT WAVE AND DX SECTION.

We were pleased to hear from C. Wadsley, of Albert Park (Vic.), who gives us the following details:—

April 12th to 17th—

42 metre band—W, K6, KA stations heard at fine strength between 2100 and 2200 EST.

31 metre band.—Australians VLQ and VLQ5 both maximum strength, Manilla, Germany (where is the Ark Royal?) and Delhi. Best time to listen is from 2100 to 2400 EST.

The Delhi station gives news at 2230, for five minutes, which will enable you to identify it.

From K. Heitsch, 3HK, we hear that KZRM, on 31 metres, can be heard at 8.30 p.m. on news at good strength; also KZRD about 11 p.m. on the same band. On the 14th April, WCAG on 31 was fair strength at 9.45 a.m.

Paris, on 25 metre band, from 1.40 p.m., on Sundays, is worth while listening to, and in case your French is weak, there are announcements in English, and news from time to time.

3HK reports also that 14 mc (20 metre) phone stations are still active. During the evenings of the week ending 18/4/40, the following were heard up till about 11 p.m.:—

XE1AC, XE2CX, CO2GY, KF6 JEG, K6MVA, KA1JH, W1FH, W1 JSG, W5KT, W3FJU, W5HXK, W8 SPU, W8IHP, W9GCH, W9QI, W9 UYB, KA1JJ, and J2XA.

On cw, XU5HR, KA1DM and the 2nd, 4th, 5th, 8th, and 9th U.S.A. districts were heard on 20.

Our thanks goes to our contributors for the above information, and we look forward to further news of general conditions, both good and bad, which will enable us to keep a check on conditions so that when the time comes for Australians to make themselves heard on the air, we will know the best bands.

As G2MI put it, "Wait till peace rages in Europe——!" He also tells us that the "G's" refer to the Hamburg announcer as "Lord Blitzspitch." Try saying it quickly!

IDENTIFICATION WANTED.

19.7 m., 1 a.m-3 a.m. Opening chimes similar to those broadcast by our "A" class stations, 9 strokes, repeated at 10 sec. intervals for 10 minutes before time signal given on the hour. Fanfare of trumpets and completion of what appears to be news service, given alternately by man and woman. No English spoken in whole broadcast.

SHORT WAVE NOTES

By F. Smith.

The final week-end of March was extremely uncertain as far as short wave reception was concerned. Reports in the daily newspapers of a very severe magnetic storm affecting the whole earth were the cause of this.

Of interest to us who were hams and are now relegated to listeners is the following list of overseas hams working on 20 metres in a contest. tween R5 and R7 in strength:— These are heard regularly and at be-W1GNO, PK1JR, XU8ZA, PK3GO, XU8AM, PK4OA, PK2AY, and PK 4JO. Other hams were heard namely, KF6JEG, K6MVA, K6HZQ.

Commercial stations heard during the period ended 18/4/40 were:— XGOY, 25.21 m., late evening, good reception and constant. Saigon, 25.47 m. Early evening onwards. Excellent. JZI, 31.46 m. Late evening, fair strength, quality O.K. KGEI, 31.48 m. Late evening, fair strength, quality O.K. KZIB, 21.55 m. 11 p.m. onwards. Good strength, slow fading. HSP6, 37.56 m. Midnight onwards. Good strength, bad fading. XMHA, 25.32 m. Early evening. Fair reception, some fading. VUDZ, 31.28 m. Late evening. Speaker strength. Excellent. KZRM, 31.35 m. to 10 p.m. on Very strong, slight fading. JZJ, 25.42 m. 10 p.m. on. Fair strength, news in English, as with JZI at 10.30 p.m. KZRH, 31.06 m. Early evening, very strong. DJR, 19.74 m. Late evening, very strong. DJQ, 19.63 m. Late evening, good strength. GRK, 30.96 m. Late evening, fair strength. strength. DJH, 16.81 m. English ZHP, 30.96 m. Early evening, fair news at 10 p.m., fair strength. JVW3, 25.59 m. Late evening, fair strength. RV96, 19.76 m. 7 p.m. Not reported until 17/4/40. Moscow at fair strength.

Australian short wave stations heard at full speaker strength during the evening are:—VLW2, 31.08 m. VLQ, 31.20 m., VLR, 31,29 m. Interference from static on the above list was not extremely severe.

Of interest to those "night owls" who like to do their listening in the "wee small hours," the following are given:—KGEI, 31 m. Midnight onwards. Reception is generally very good. News at 12.30 a.m. Rome, 25 m. Strong signal. English news, 1.30 a.m. Paris, 25 m. Strong signal. English news at 1.45 a.m. broadcast for North America.

Radio Saigon, 25 m. are very strong and relay the above news session. Listen for them.

KZRH, 31 m. Very strong and at 1.15 p.m., broadcast a request session, and ask for request numbers from Australian listeners. Well worth hearing. XGOY, after midnight, are fairly good on 25 m.

India (VUD), 25 m. English news 1.45 a.m. Good. MCC7 China, 25 m. Good strength around 1.15 a.m. KZ RM, 31 m. Another old favourite. Close down 1.30 a.m. Australian S.W. stations carry on until about 1.30 a.m.

Acknowledgments to Mr. F. J. Miller and Mr. Barrasford for their very excellent lists from which the above were taken.

(Continued from page 17)

contact amateurs in belligerent countries, but this request has not been acted upon, and the Germans can be heard in daily contact with stations in the U.S.A. They are disseminating their propaganda in this method and the authorities here may well consider the advisability of permitting certain VK stations to come on the air solely for the purpose of combating this German attempt to build up friendships with neutrals.

Consider, for instance, the German amateurs contacting amateurs in U.S.A. alone—in the U.S. there are approximately 60,000 active amateurs. Continual contact with German stations will possibly lead the average American amateur (as well as his family and immediate friends) to come to the belief that his new-found friend in Germany is being very harshly treated by the Allied Blockade and the Allies generally. There is then born a new enemy to the Empire instead of a friend who may possibly be retained were he permitted the opportunity of contact with his old friends in Australia.

Divisional Notes

IMPORTANT.

To ensure insertion, all copy must be in the hands of the Editor not later than the 18th of the month preceeding publication.

N.S.W. DIVISIONAL NOTES.

The April General Meting of the Institute was held at Y.M.C.A. Buildings on Thursday, 18th April. The atendance was excellent. The Divisional President, H. Peterson, VK 2HP, ocupied the chair, and in opening the meeting extended a hearty welcome to Messrs. John Foldi, VK 4KT, of Papua. A. D. Boyle, ZL2VM and Malcolm Perry, ex-XCP, ex-A2MP and ex-VK2DG.

Members were informed that Council had received the resignations of Cec. Horne, 2AIK, from the Secretaryship, and Ross Treharne, 2IQ, as Technical Officer. These resignations were received with regret. 2AIK, who is in the Department of Education, found that his work in this field prevented him giving his whole attention to the Institute. Cec is a distinct loss to the Division, as during his term of office as secretary, he proved himself a very conscientious officer, whose only thought was the welfare of the W.I.A. Ross Treharne, 2IQ, is a student at Sydney University, and his studies, this year, preclude him from taking any active part in the affairs of the Division. It is expected that before very long Ross will have attained the degree of B.Sc.

Wal Ryan, VK2TI, was elected to the position of Secretary and Messrs. Alan Joscelyne, VK2AJO, and Fred Carruthers, VK2PF, were elected to the two vacancies on the Council.

Members were informed that the Division had not given up hope of getting back on the air, and that F.H.Q. had been written to pointing out that in the early days of the war that Government of South Africa had allowed the S.A.R.R.L. to have two stations on the air on Sunday mornings transmitting news to amateurs. Now the ban has been further lifted. Persons approved by the S.A.R.R.L. and found suitable by the authorities are now to be allowed to transmit.

The ban on publications from non-sterling countries was also pointed out to members, and particular reference was made to Q.S.T. and Radio. Members were informed that they would be able to obtain Q.S.T. through the Institute by forwarding postal note for £1/1/ for 12 months subscription. This, incidentally would be considerably less than the price paid to book stalls prior to the ban on importations.

It has been decided to make a presentation of a wallet with the Institute badge attached to all members of the Division serving overseas. In addition, a letter of introduction to the various national societies written in five different languages, will also be given members.

At the conclusion of general business, a very interesting talk was delivered by Mr. Malcolm Perry, ex-XCP, ex-A2MP, and ex-VK2DG. Malcolm is a foundation member of the Division, or perhaps I should say, the Institute, and was the first secretary, duly elected on the 14th March, 1910, at a meeting held at the Hotel Australia. Mr. Perry had for his subject "Pioneer Days," and traced the history of Amateur Radio from the year 1905 up to the time that he relinquished his position as secretary in 1923. Among many interesting points brought out in the talk was the fact that the Institute in 1911 furnished the radio operators for the Mawson Expedition to the South Pole. It was quite interesting to hear the first secretary of the Wireless Institute of Australia and the present secretary pointing out what the Institute did in the old days and what it did in the present age.

Upon conclusion of the lecture, a vote of thanks was moved by Mr. Carruthers, 2PF, and seconded by Ross Treharne, 2IQ, and carried by acclamation. Mr. Perry in his reply stated that he felt it an honor to be asked to address members of the Wireless Institute of Australia—the

oldest amateur body in the world today, and stated his willingness to again address members whenever they so desired.

VK4KT, John Foldi, from Papua, is bemoaning the cold(?) weather that he experienced here in VK2 since he came down late in February of this year. John by the way had an addition to the family recently, and is now the proud father of two junior ops. John also is an old timer and was dabbling in radio during the last war.

2YC is wearing a big smile these days. No more cards in the QSL bureau.

2ADE, Chas. Miller, has gone looking for the DX that he used to work. We don't know yet whether it is ZC 6EC or G6WY.

2TI. Wal would like to know the guy who drew that caricature in the T. and R.

2HP, Harold is tickled quite pink that after twenty-six years he will soon have a daughter in the family.

VICTORIAN DIVISION.

KEY SECTION NOTES.

By VK3CX.

The April meeting of the Victorian Division held some surprises—the main one being that RJ was at last heard on 'phone. The meeting opened with RJ in the chair, and an attendance of 25, the usual batch of QSL's were distributed and the gang were introduced to the main distinguished visitor of the evening, who was G6LU. He gave us a very interesting account of how English hams were closed down by the authorities at the outbreak of war, and what happened to their gear. One would almost think that G6LU was a dinkum Aussie by his command of their language.

The event of the evening followed —D.H. giving a most interesting lecture on how to make your own gramophone records. The apparatus used was demonstrated by its owner, S.B. in collaboration with D.H. which added materially to the edification and enjoyment of the gang. The best part of the night was when S.B. produced a blank disc and proceded to make a recording of all the boys present at the meeting. 'Twas then that we lost faith in mankind for our one and only RJ—the maestro of the key —was heard speaking into a mike—and let me tell you, he made a much better job of it than 95 per cent. of the 'phones that I have heard on the air. As soon as everyones' voices had been recorded, the machine was turned round and the record played back to the meeting. Much amusement was caused by the fact that the mike was particularly sensitive and picked up all the back chat that was going on around the room while speakers were pausing for breath. The meeting closed after 2300, everyone agreeing that it had been one of the best.

One of our foremost DXers has been bitten by a new bug—it's QK, who has been spending his time at Churchill Island fishing and shooting. You should hear him tell about the one that got away, and with the gun it's just another case of "run, rabbit, run!"

Everyone seems to be going bush—here's RN building a five roomed shack out in the mulga, complete with bell-birds as alarm clocks. SQ is building transceivers and selling them to the Forestry Commission, and TE has just returned from a 1500 mile trip in VK5 with a baby Austin and trailer.

And did you hear about the two ladies in London recently, said one, "Emma, dear, who knows with these 'ere hair raids we might both be blown into maternity." "Yus, dearie, and with these 'ere blackouts we won't know who did it neither!" Or maybe I shouldn't have mentioned it.

XJ has his own personal visiting cards printed now—ask him for one as they are well worth seeing. Incidentally, he has now built a regenerative preselector onto the front of his Hallicrafters SX16 and says it's fb. FR is building an amplifier and hopes to follow it up with a modulator—gawd knows what for. ZU says he heard some QRM on 20 metres band (personally I don't believe him), but says it was a W contest—don't you wish you were in it, too?

JO had a letter from 7KQ, which reveals that Gil is more fortunate than most hams in that he is still able to play around with transmitters. 7HT is the transmitter in question, and has been occupying most of Gil's time. However, he has promised to help us keep the mag. going and we can look out for a technical

article from him shortly. We wish there were more like him.

And did you hear the story that there is a big possibility of certain ZS stations being allowed back on the air again? Don't know how true it is but if they get back on there's hope for us yet. And in regard to this getting on the air business — don't let your enthusiasm run away with you like a certain interstate ham, who was heard working 40 metre 'phone with another state. He was caught, and I don't know what is gonna happen to him, but I, for one, wouldn't like to be in his cell.

SOUTH AUSTRALIAN NOTES,

During the last nine years I have seen many changes in the S.A. Division of the Institute, and I would not like to see the division fail for lack of interest. I remember the first meeting I attended was at the A.N.A., Flinders Street, introduced incidentally by Doug. Whitburn, 5BY; later we moved to Rundle Street, where we nested for quite a few years. I've seen many of the now ex-hams take the exams for their tickets and remember how much the socials we held on meeting nights were appreciated.

Many old members will recall that the ham tests we held were great successes.

So last year (April 19th, 1939) members decided to incorporate the W.I.A. in their State, and the Society of the W.I.A., S.A. Division was formed. The attendances were fine and everything was going well until, suddenly, comes the war, and away the members went to join various units.

As one of the Foundation members of the Society, I should like to remind such members as may be available, that only by their co-operation can we expect to keep the spirit of Amateur Radio alive in this State.

Some of the members still come along for code practice, but we need more.

We are holding our annual meeting, Wednesday, 17th April, so look for the report of this meeting to see how we intend spending the coming year.

WATERLEY RADIO CLUB TO CELEBRATE ITS 21st ANNIVERSARY

It was the year 1919. The Great War of 1914-18 was over. The Peace that was to be an everlasting one had been signed. The youth of the country was now free to lay down arms — arms that had been so valiantly carried — and to turn to the pursuits of Peace. Out came the football jersey, the cricket flannels, tennis racquets and hockey sticks. The more technical minded turned to their hobbies, and out Waverley district quite a few chaps were interested in the comparatively new science of Wireless.

Among these amateurs of those days—possibly looked upon as having some strange mental kink—were Frank Geddes, Jnr., Frank Leverrier, Eddie Bowman, E. Swinbourne, R. D. Charlesworth, Les Holdsgrove, Alan Burrowes, C. Doyle, G. Thompson and Malcolm Perry.

Wireless intrigued these young fellows and the procedure adopted to discuss the various problems associated with transmitting and receiving on 1100 metres (?) was for them to meet and discuss their troubles at the various homes. This was not satisfactory. Messrs. R. Charlesworth, F. Geddes, E. Bowman and Alan Burrows decided that the experimenters in the Waverley District should be organised.

On the night of January 27th, 1919, a meeting was held at the home of Mr. R. Charlesworth and the Waverley Amateur Radio was the outcome. Mr. R. Charlesworth was elected President, F. Geddes, Vice-President, and Alan Burrowes, secretary. Mr. F. Geddes Senior, made a room available at his residence, 13 MacPherson Street, Waverley, and from that date to the present time all meetings have been held at that address. A visit to the club-room to-day will show a wonderful display of real DX QSL cards. I have before me, by courtesy of Gordon Thompson, ex-2GT, the first license issued to the club and it differs quite a lot from the present day experimental license, not only that it costs £2, but the whole Regulations are contained in its five pages!

It was issued on the 18th August, 1921, and was numbered 249.

Prior to the issue by the P.M.G. of this license, wireless was controlled by the Navy, and permission had been granted to use 1100 metres, with a call sign using the prefix N followed by a serial number.

With the advent of Post Office control, wave lengths below 200 metres were made available to experimenters and the first transmitter using a VT1 with 90 volts on the plate was constructed by Messrs. Thompson, Leverrier and Geddes, and great was the excitement when a report was received from Campsie.

No doubt, if any of the foundation members had seen the fine exhibits of gear shown by the Club at the Exhibitions recently, sponsored by the New South Wales Division, their thoughts would have flown back to the VT1.

By 1922, the Club had made considerable progress, and in conjunction with the Wireless Institute of Australia, organised the Trans-Pacific tests with Californian amateurs. Through the courtesy of Malcolm Perry I was able to see one of the original entry forms. Entrance fee was ten shillings, and if you did not intend to take part you were asked to sign a declaration that you would not transmit during the period of the contest, which was an endeavour to hear American signals at stated periods. Almost 100% co-operation was received from non-participants. Just think of that. Fancy suggesting to some of the present day "ex-fone hounds" to observe a silent period during the VK-ZL, B.E.R.U. or A.R.R.L. DX Contests! Incidentally, the band used was 200 metres, and the contest was won by a ham at Ramsgate.

The next move was to 80 mx, and A2BV was one of the first calls on that band, which was considered U.H.F. in those days. The 80 mx. transmitter was built by Gordon Thompson. In the meantime a 70 foot mast had been erected, and great things were expected from the new receiver and antenna.

In its usual go-ahead manner the Club organised the VK-ZL Tests on 80 metres. This was a test for two-way communication, and was the fore-runner of the VK-ZL 80 mx contest now controlled by the N.Z. A.R.T. and the W.I.A. This initial contest was won by Jack Davis, 2DS, of Watson's Bay.

Prior to the Trans-Pacific and Trans-Tasman Tests, the Club was well to the fore with its social activities. The first successful Radio Music Dance held in Australia took place at the Athenaeum Hall, Beach Street, Coogee, on 22nd September, 1922. Quoting from the programme, "The music will be transmitted by Mr. R. Allsop, Wireless Electric Company, Beach Street, Coogee. Mr. Allsop is also kindly installing his Magnavox, which shall be the means used to amplify the wireless music. The music received will be Pathe Sapphire Disc Records." Shades of Jim Davidson! Unfortunately, the licence held by 2YG did not cover the location from whence the transmissions were made, and several weeks after, Ray received a please explain from the R.I.! There must have been a Vigilance Committee even in those days.

Shortly after the 80 mx Trans-Tasman Tests, experiments were carried out by the Club, in conjunction with W. Cottrell, 2ZN, on five metres, using a Split Colpitts circuit, with 201A's as the oscillating medium. Experiments on wave lengths as low as 2½ metres, measured by Lecher Wires, were also made.

The first Club Journal was published sometime in 1924 and ran for approximately 18 months. A magazine was again published in 1934-1935, and the technical articles were of a very high standard.

Looking through some notes it would appear that during 1926 the burning topic among all Radio Clubs was whether they should affiliate with the W.I.A. Some remarks by Alan Burrowes are very illuminating in their frankness regarding the necessity for affiliation.

In 1933, the first Television transmission in Australia took place between the home of Mr. Pickering, VK2KI, located at North Bondi, and the Club Rooms, at Waverley. For some considerable time Mr. Gordon Wells and Mr. Pickering had been experimenting with mechanical scanning, and their efforts were brought to a successful conclusion on this winter night of 1933.

The first public demonstration of television in Australia was given at the Wireless Institute of Australia Amateur Exhibition, held at the

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